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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,276	12/02/2003	Tuck Wah Ng	2500-000018	3381
27572	7590	03/14/2006	EXAMINER	
HARNESS, DICKEY & PIERCE, P.L.C. P.O. BOX 828 BLOOMFIELD HILLS, MI 48303			CONNOLLY, PATRICK J	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 03/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/726,276	NG ET AL.	
	Examiner	Art Unit	
	Patrick J. Connolly	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 February 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 18-24, 31-35, 41 and 42 is/are rejected.
- 7) ☒ Claim(s) 10-17, 25-30 and 36-40 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>12.02.03; 09.20.04</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

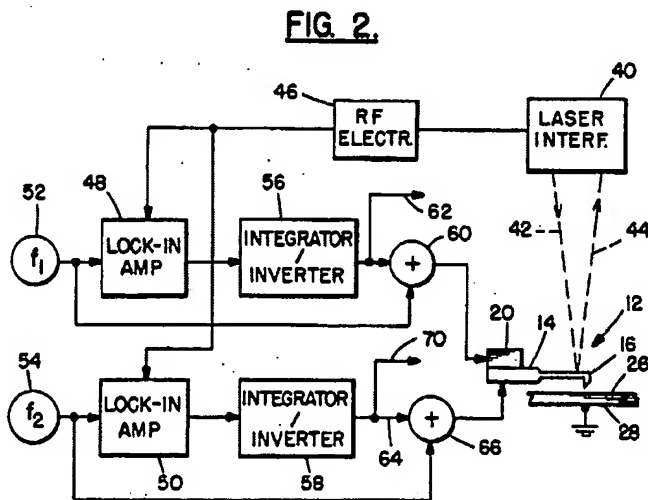
The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims **21 and 33** are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. Patent No. 5,267,471 to Abraham et al (hereto Abraham).

As to claims **21 and 33**, Abraham discloses a double cantilever sensor for atomic force microscopy including (see Figure 2 below):



interferometer means (40) for converting a light beam reflected off a probe into an interference beam (see column 4, lines 48-58);

detecting means for outputting a signal responsive to said interference beam incident on said detecting means(see column 4, lines 48-58);

and processing means operable on said response signal to represent a characteristic of said sample surface (62, 70 not pictured, see also column 5: lines 1-5 and 28-40).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

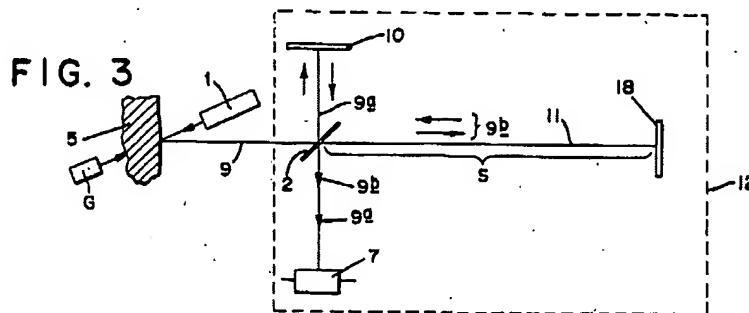
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-9, 18-20, 22-24, 31, 32, 34, 35, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abraham as applied to claims 21 and 33 above, and further in view of U.S. Patent No. 4,046,477.

As to claim 1, Abraham teaches an interferometric method for monitoring an atomic microscopic probe.

Abraham does not teach the specific interferometric arrangement for measurement of the probe head.

Kaule teaches an interferometric method and apparatus for sensing the surface and deformation of an object subjected to vibration and deformation (see Figure 3 below).



As to **claim 1**, Kaule teaches:

splitting a light beam reflected off a tip of the surface (5) into two beams with different path lengths and recombining the split beams to form an interference beam;

illuminating the interference beam on a photodetector (7), said photodetector providing a signal responsive to the interference beam; and

processing the response signal to represent a characteristic of the sample surface (not shown, see for example column 5, lines 50-60).

Kaule teaches that this method of measuring a surface's motion and deformation is a highly accurate, non-contact method.

Kaule does not teach monitoring a scanning probe tracing a sample surface.

It would have been obvious to one of ordinary skill in the art at the time of invention to use the interferometric setup of Kaule in place of the generic interferometric setup of Abraham so as to achieve accurate, non-contact measurements of the probe head.

As to **claim 2**, Abraham teaches a cantilever suitable for use in an atomic force microscope, said probe having a sensing tip near the free end of the cantilever, said tip disposed proximate to the sample surface and the cantilever reflection surface is opposite the sensing tip (see Abraham Figure 2 above, also Figure 1).

As to **claim 3**, Kaule teaches splitting and recombining light in an interferometer (see Figure 3 above).

As to **claims 4, 22 and 34**, Kaule discloses mounting an actuator on a mirror to adjust the interference pattern (see column 5, lines 34-38).

As to **claims 5, 6 23, 24 and 35**, Kaule does not disclose mounting the second mirror on an actuator.

Kaule does disclose modulating the first mirror mounted on an actuator (see column 5, lines 40-60).

The examiner takes Official Notice of the fact that it is well known to mount mirrors on actuators in Michelson interferometer arrangements so as to be able to adjust and modulate said mirrors easily and accurately.

It would have been obvious to one of ordinary skill in the art at the time of invention to mount both the first and second mirrors on actuators so as to achieve accurate adjustment of the pattern with one mirror and to have separate modulation capability on the second mirror.

As to **claim 7**, Abraham teaches the probe on a piezoelectric system (see Abraham Figure 1, element 20).

As to **claim 8**, Abraham teaches outputting the signal to a position control system to provide a position signal operable to drive said PZT system (see Abraham, Figure 2, elements 48, 50, 56, 58, 60, 66)

As to **claim 9**, Abraham does not teach generating raster signals to the PZT system to scan the surface of the sample.

The Examiner takes Official Notice of the fact that it is well known to use raster signals in combination with atomic force microscope probes for surface scanning so as to provide efficient, complete surface profile measurements.

It would have been obvious to one of ordinary skill in the art at the time of invention to include raster scanning signal inputting in the method of Abraham so as to achieve the above advantages.

As to **claim 18, 31 and 41**, Abraham does not teach an array of scanning probes.

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The Examiner takes Official Notice of the fact that it is well known in the art to simultaneously use multiple scanning probes in atomic force microscopy so as to achieve faster scanning.

It would have been obvious to one of ordinary skill in the art at the time of invention to include an arrangement for array scanning in the apparatus and method of Abraham so as to achieve faster scanning times.

As to claims **19, 20, 32 and 42**, Abraham teaches making topographical and surface potential measurements (see for example, top of column 3).

*Allowable Subject Matter*

Claims 10-17, 25-30 and 36-40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

As to **claim 10**, the prior art of record, taken alone or in combination, fails to disclose or render obvious a method for monitoring a scanning probe tracing a surface of a sample including: modulating the fringe pattern of the interference beam with a transmission grating, in combination with the rest of the limitations of claim 10.

As to **claims 25 and 36**, the prior art of record, taken alone or in combination, fails to disclose or render obvious a system for scanning probe microscopy of a scanning probe microscope including grating means disposed in the path of the interference beam, in combination with the rest of the limitations of claims 25 and 36.

**Claims 11-17, 26-30 and 37-40** are objected to by virtue of the respective dependencies on **claims 10, 25 and 36**.



"Several facts have been relied upon from the personal knowledge of the examiner about which the examiner took Official Notice. Applicant must seasonably challenge well known statements and statements based on personal knowledge when they are made by the Board of Patent Appeals and Interferences. In re Selmi, 156 F.2d 96, 70 USPQ 197 (CCPA 1946); In re Fischer, 125 F.2d 725, 52 USPQ 473 (CCPA 1942). See also In re Boon, 439 F.2d 724, 169 USPQ 231 (CCPA 1971) (a challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice). If applicant does not seasonably traverse the well-known statement during examination, then the object of the well known statement is taken to be admitted prior art. In re Chevenard, 139 F.2d 71, 60 USPQ 239 (CCPA 1943). A seasonable challenge constitutes a demand for evidence made as soon as practicable during prosecution. Thus, applicant is charged with rebutting the well-known statement in the next reply after the Office action in which the well known statement was made."

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick J. Connolly whose telephone number is 571.272.2412. The examiner can normally be reached on 9:00 am - 7:00 pm Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on 571.272.2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

pjc 876  
68.10.2004



HWA (ANDREW) LEE  
PRIMARY EXAMINER